Wetland Value Assessment Project Information Sheet

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Prepared for:
U.S. Army Corps of Engineers

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Project Name: Fifi Island CAP 204 Marsh Creation Site

Project Addendum: Additional WVA's for marsh creation cells A & H

Project Type(s): Marsh Creation

Project Area: The Fifi Island Marsh Creation site is located north of Grande Isle in Jefferson Parish, Louisiana (Figure 1).

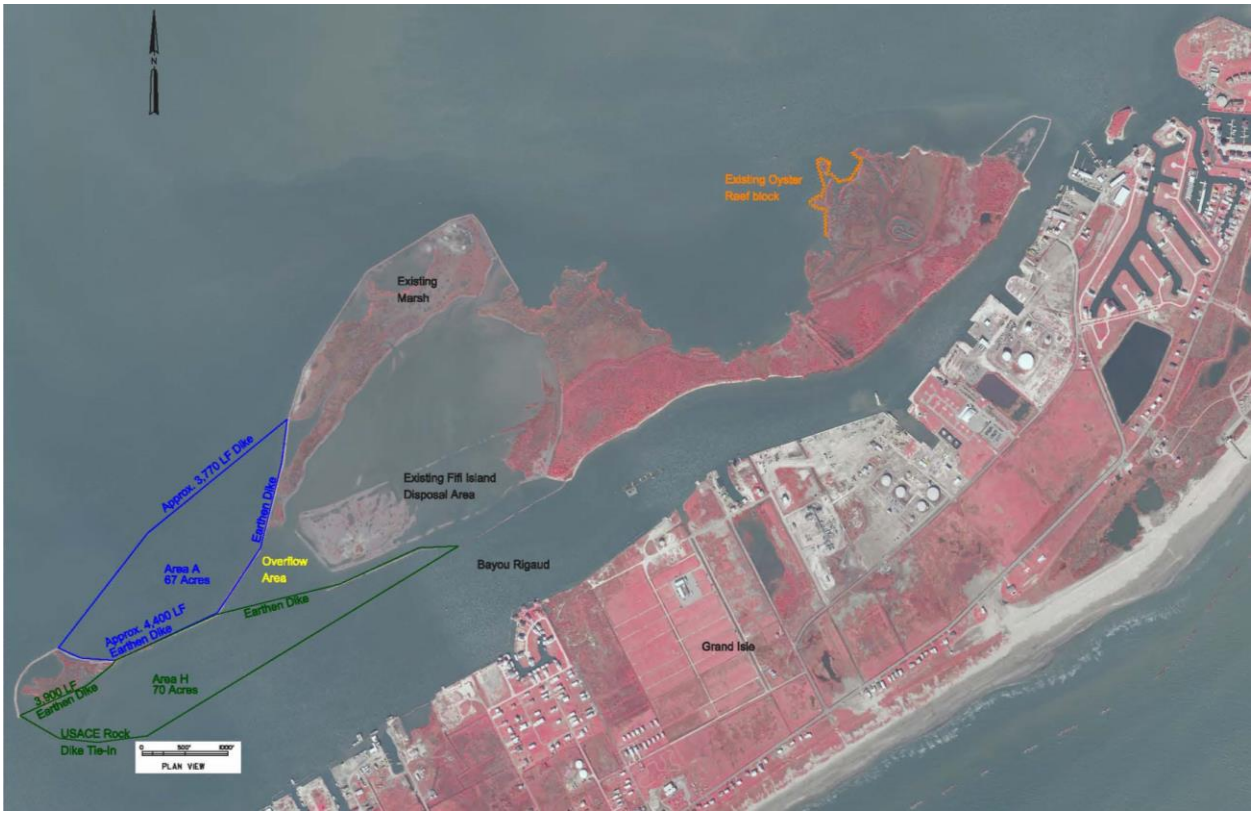

Figure 1. Project Area.

Problem:

Fifi Island is susceptible to interior marsh breakup from natural subsidence and shoreline erosion from tidal dynamics. An analysis of erosion rates on the north side of the island was performed for the period of 1945 to 2009. Approximately 87 acres of land, totaling 18 % of emergent land, have been lost from Fifi Island over the 64 year period. Estimates predict the loss of an additional 121 acres of land area over the next 50 years if current rates of erosion continue. The Fifi Island CAP 204 Marsh Creation project will utilize dredged material beneficially to create/restore lost wetlands, enhance existing wetlands, and provide habitat for a variety of fish and wildlife species.

Project Goal:

The project features the creation of emergent tidal marsh in several alternate locations. Existing marsh elevations differ from site to site and range from approximately +1.0 feet to -6.0 feet NAVD88. Cooperating agencies will determine the elevation for dredge fill needed to ensure a target elevation conducive to marsh creation. Marsh creation cells will be planted at a rate of 100% with appropriate saline marsh species (e.g., *Spartina alterniflora*). Dredge materials will be contained by both rock and earthen dikes. The rock dikes would also serve as shoreline protection features to reduce wave breaching and slow shoreline erosion that would be detrimental to all proposed marsh creation cells. Gaps will be constructed in the containment dikes during TY1 to allow fish and other aquatic organisms access to the created marsh.

Addendum Goal:

The addendum features the creation of 67 acres of marsh in area "A" and 70 acres of marsh in area "H" creating 137 acres of saline tidal marsh in total.

Existing Wetlands:

The project area and surrounding marsh has consistently been classified as saline marsh (Chabreck and Linscombe 1997, Sasser et al. 2008, Sasser et al. 2014). Marsh creation areas A & H are completely open water. Site visits confirmed water depths of the proposed marsh creation cells. Aquatic vegetation is not known to exist in the waters of these proposed sites which was also confirmed during the site visit as no submerged aquatic vegetation (SAV) was observed in any of the alternate marsh creation cells. These data were utilized in conducting a Wetland Value Assessment (WVA) using the saline marsh model.

Habitat Assessment Method:

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The WVA model for marsh habitat attempts to assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. While the model does not specifically assess other wetland functions and values such as storm-surge protection, floodwater storage, water quality improvement, nutrient import/export, and aesthetics, it can be generally assumed that these functions and values are positively correlated with fish and wildlife habitat quality.

The procedure for evaluating project benefits on fish and wildlife habitats, the WVA model, uses a series of variables that are intended to capture the most important conditions and functional values of a particular habitat. Values for these variables are derived for existing conditions and are estimated for conditions projected into the future if no restoration efforts are applied (i.e., future-without-project), and for conditions projected into the future if the proposed restoration project is implemented (i.e., future-with-project), providing an index of quality or habitat suitability of the habitat for the given time period. The habitat suitability index (HSI) is combined with the acres of habitat to get a number that is referred to as "habitat units". Expected project benefits are estimated as the difference in habitat units between the future-with-project (FWP) and future-without project (FWOP). To allow comparison of WVA benefits to costs for overall project evaluation, total benefits are averaged over a 50-year period, with the result reported as Average Annual Habitat Units (AAHUs).

Land Loss Data

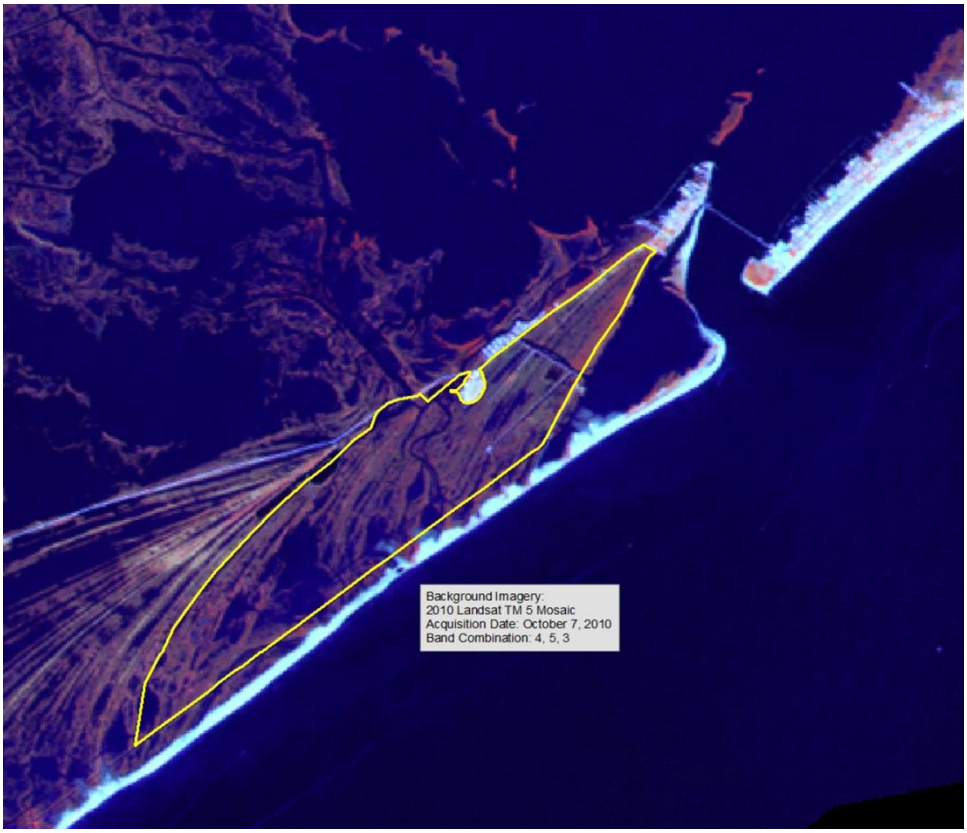

Figure: 2. USGS Extended Boundary used to estimate land loss for Fifi Island.

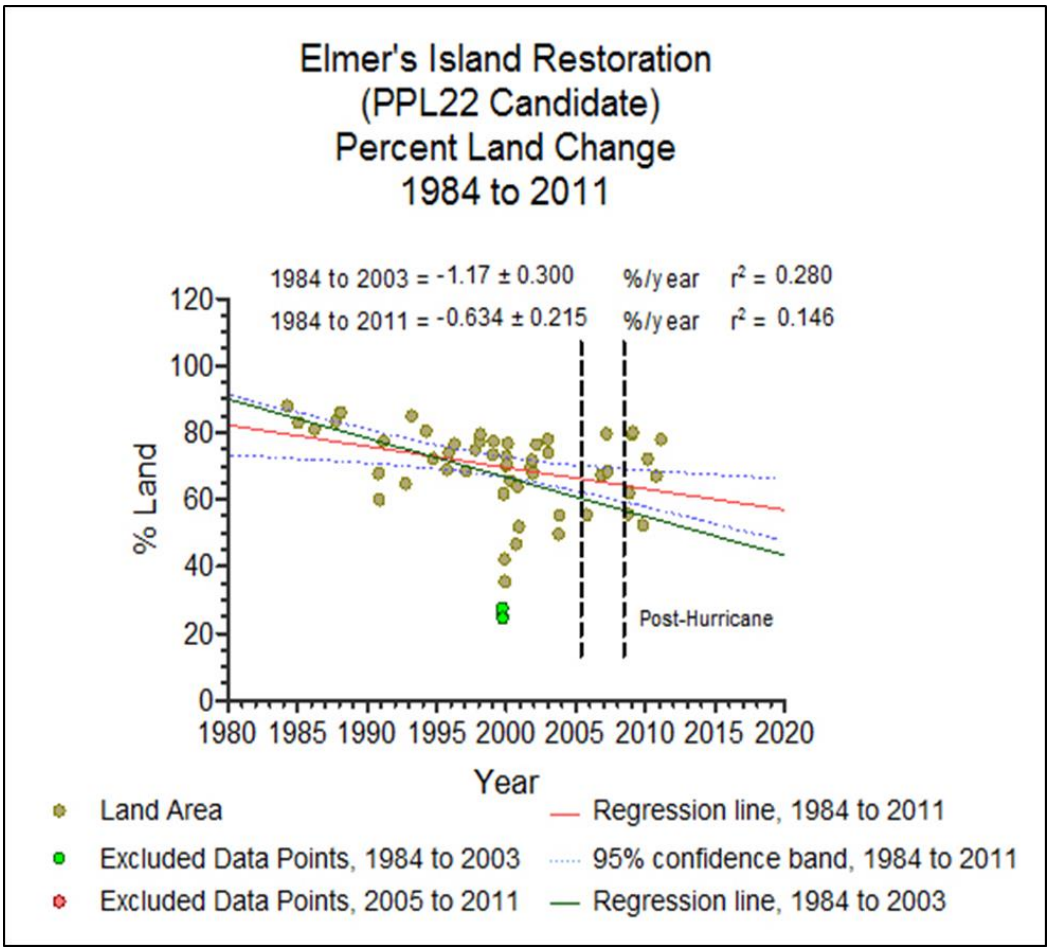

Figure 3. Land loss rate determined by USGS

The Fish and Wildlife Service calculated land loss rate using the same USGS Land/Water data, but with a different regression (land acres : time). That rate was used to calculate land/water values over the life of the project.

Extended Boundary Percent Loss Rate = -0.634 ± 0.215%

FWOP loss rate: -0.80 % = -0.54 ac/yr and -.56 ac/yr for areas A and H respectively.

FWP loss rate: -0.40% = -.27 ac/yr and -.28 ac/yr for areas A and H respectively (resumes to background loss rate at TY42).

Land loss rates were adjusted by the projected effects of three Relative Sea Level Rise (RSLR) scenarios. The **medium RSLR** scenario was chosen for these analyses.

Variable V1: Percent of wetland area covered by emergent vegetation

FWOP– Marsh creation areas A & H are currently all open water. Under current subsidence rates, areas A & H will continue to be open water through all years for FWOP.

Area A			
		acres	%
TY0-TY50	Marsh	0	0
	Water	67	100

Area H			
		acres	%
TY0-TY50	Marsh	0	0
	Water	70	100

FWP– It is assumed that all acres within the project area would be marsh creation (i.e., no marsh nourishment assumed). Created marsh platform has limited marsh function until settlement and breaching of retention dikes. Land loss is applied at the time of marsh creation. The rate is 50% of the background loss rate until TY42 when at least10 inches of organic accretion is projected to cover the marsh and background loss rate is resumed. Based on standard civil works project assumptions to account for 100% marsh planting post creation; 10 % marsh credit was applied at TY1, 25% credit at TY 3, and 100% credit at TY5. Created marsh platform is assumed to be converted to marsh by TY5.

Area A			
		acres	%
TY0	Marsh	0.00	0.00
	Platform	0.00	0.00
	Water	67.00	100.00
TY1	Marsh	6.67	10.00
	Platform	60.04	89.57
	Water	0.29	0.43
TY3	Marsh	16.54	24.70
	Platform	49.62	74.05
	Water	0.83	1.25
TY5	Marsh	65.62	97.90
	Platform	0.00	0.00
	Water	1.38	2.06
TY6	Marsh	65.35	97.50
	Platform	0.00	0.00
	Water	1.65	2.47
TY25	Marsh	58.74	87.70
	Platform	0.00	0.00
	Water	8.26	12.33
TY50	Marsh	45.65	68.10
	Platform	0.00	0.00
	Water	21.35	31.87

Area H			
		acres	%
TY0	Marsh	0.00	0.00
	Platform	0.00	0.00
	Water	70.00	100.00
TY1	Marsh	6.97	10.00
	Platform	62.73	89.57
	Water	0.30	0.43
TY3	Marsh	17.28	24.70
	Platform	51.85	74.05
	Water	0.87	1.25
TY5	Marsh	68.56	97.90
	Platform	0.00	0.00
	Water	1.44	2.06
TY6	Marsh	68.27	97.50
	Platform	0.00	0.00
	Water	1.73	2.47
TY25	Marsh	61.37	87.70
	Platform	0.00	0.00
	Water	8.63	12.33
TY50	Marsh	47.69	68.10
	Platform	0.00	0.00
	Water	22.31	31.87

Variable V2: Percent of open water covered by aquatic vegetation

Existing Conditions –The project area is largely deep open water (water depth > 1.5 ft) with no SAV known to exist. Water depths and SAV occurrence in project area were collected and confirmed by USFWS personnel on site visit. Existing SAV conditions are expected to continue. Tidal fluctuations, currents, wave action, salinity, and overall system energy may hinder SAV occurrence. Therefore, SAV coverage is estimated and proposed at 0% for all FWOP and FWP target years for both marsh creation areas.

FWOP and FWP–(Areas A & H) TY0-TY50: 0%

Variable V3: Marsh edge and interspersion

Existing Conditions – The proposed marsh creations cells (Areas A & H) are entirely open water. Under the current erosion and subsidence regime, the marsh creation areas will continue to be 100% open water. Therefore, 100% Class 5 is proposed for all years for FWOP for both areas.

FWOP–(Areas A & H) TY0 – TY50: 100% Class 5

FWP–

Area A			
	Class	%	Notes
TY0	5	100	standard assumptions
TY1	5	100	standard assumptions
TY3	3	100	standard assumptions
TY5	1	50	standard assumptions
	3	50	standard assumptions
TY6	1	100	standard assumptions
TY25	2	100	approx. 88 % marsh
TY50	3	100	approx. 68 % marsh

Area H			
	Class	%	Notes
TY0	5	100	standard assumptions
TY1	5	100	standard assumptions
TY3	3	100	standard assumptions
TY5	1	50	standard assumptions
	3	50	standard assumptions
TY6	1	100	standard assumptions
TY25	2	100	approx. 88 % marsh
TY50	3	100	approx. 68 % marsh

Variable V4: Percent of open water area ≤ 1.5 feet deep in relation to marsh surface

Existing Conditions– Water depths were measured with a survey rod in the project area on 10 April 2013. The average water depth for the area was calculated using the gauge data from USGS (USGS 07380251 Barataria Bay N of Grand Isle, LA). Using the gauge data, the collected data was corrected for the effect of the tides and wind on the day the measurements were recorded. The Corps' RSLR estimates predict a sea-level rise of approximately 2.0 feet over the next 50 years under the Intermediate RSLR scenario (LCWC 1999). It was assumed that RSLR will reduce the existing shallow open water for FWOP by 1/3 at TY50.

FWOP– Assuming a 1/3 reduction in shallow open water at TY50.

Area A		
	Water ≤ 1.5ft (%)	Notes
TY0	1	
TY1	1	
TY3	1	
TY5	1	
TY6	1	
TY25	1	
TY50	0	Reduced by 1/3

Area H		
	Water ≤ 1.5ft (%)	Notes
TY0	5	
TY1	5	
TY3	5	
TY5	5	
TY6	5	
TY25	5	
TY50	3	Reduced by 1/3

FWP– It is assumed that all open water is less than 1.5 ft deep at TY1 through TY25. By TY50, it is assumed that continued subsidence and sea level rise will result in the formation of some open water greater than 1.5 feet deep. Marsh that is lost is assumed to become open water ≤ 1.5 feet deep until TY50. At that point, it is assumed that 1/6 of the shallow open water would become deeper than 1.5 feet. In Area A, 3.55 ac out of the 21.35 ac of open water would become greater than 1.5 ft deep and 3.72 ac out of the 22.31 water acres in Area H would become greater than 1.5 ft deep.

Area A		
	Water ≤ 1.5ft (%)	Notes
TY0	1	
TY1	100	
TY3	100	
TY5	100	
TY6	100	
TY25	100	
TY50	83	3.55 ac ≥ 1.5 ft deep

Area H		
	Water ≤ 1.5ft (%)	Notes
TY0	5	
TY1	100	
TY3	100	
TY5	100	
TY6	100	
TY25	100	
TY50	83	3.72 ac ≥ 1.5 ft deep

Variable V5: Salinity

Existing conditions - Mean annual salinity for CRMS station 0178 for the period April 2007 to June 2015 was 16.06 ppt (Figure 4). Salinity is not assumed to change FWOP or FWP.

FWOP & FWP–
TY0 – TY50: 16 ppt

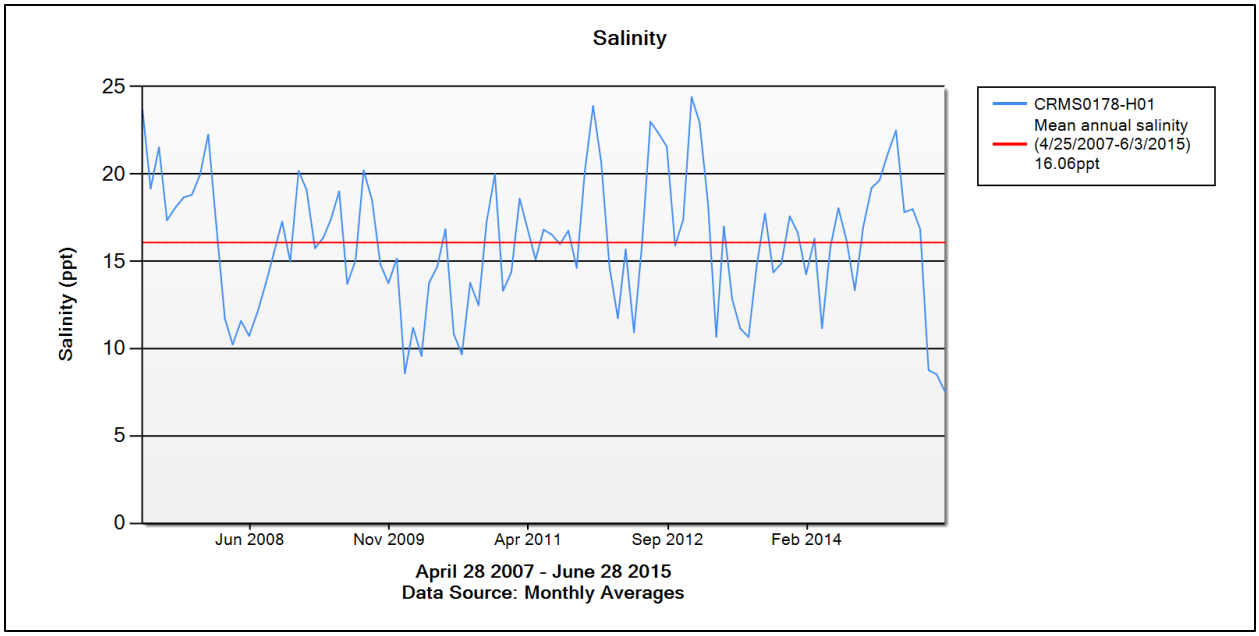

Figure 4. Mean annual salinity from CRMS 0178.

Variable V6: Aquatic organism access

Existing conditions – Areas A & H are not impounded nor have any hydrological controls. Access to all parts of project area is assumed to be equal. Existing conditions are expected to continue for all years for FWOP.

FWOP and FWP–(Areas A & H) TY0-TY50: 1.0

FWP–Post construction, retention dikes will block all aquatic organism access. However, at TY1 foreshore rock containment dikes will be breached with 25 ft "fish dips" every 1000 ft to allow for aquatic organism access. At TY3, the marsh platform is still at 75% of the created area thus we propose an access value of 0.25. We propose full access value beginning at TY5 when project area is 100% marsh and water. It is assumed that all aquatic organisms will have total and equal access to sites from TY5-TY50.

Areas A & H		
	Access Value	Notes
TY0	1.00	standard assumptions
TY1	0.00	fish gaps constructed
TY3	0.25	platform @ 75%
TY5	1.00	100% marsh & water/full aquatics access
TY6	1.00	standard assumptions
TY25	1.00	standard assumptions
TY50	1.00	standard assumptions

Literature Cited

Chabreck, R. and G. Linscombe. 1997. Vegetative type map of the Louisiana coastal marshes. Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA.

Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority [LCWC]. 1999. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices. Appendix C – Region 1 Supplemental Information. Louisiana Department of Natural Resources. Baton Rouge, La.

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Sasser, C.E., Visser, J.M., Mouton, Edmond, Linscombe, Jeb, and Hartley, S.B., 2014, Vegetation types in coastal Louisiana in 2013: U.S. Geological Survey Scientific Investigations Map 3290, 1 sheet, scale 1:550,000.